REMARKS:

Claims 1-6 are in the case and presented for consideration.

Claims 1-6 were rejected under 35 USC 103(a) as being obvious from U.S. patent 6,747,434 to Pigott, et al. in view of U.S. patent 4,631,657 to Hill, et al.

Applicant traverses the Office's obviousness rejection on the following grounds. Both of the cited references fail to teach or suggest at least one element or limitation recited in independent claims 1, 5 and 6.

First, Pigott '434 does not teach or suggest "program means for executing a real-time controller program containing an objective function," as recited in claim 1. The main idea of the Pigott '434 patent is the adjustment of acceleration and deceleration profiles while the profile is being executed. In the Pigott '434 patent, these profiles are preset. Thus, a modification is made from one preset profile to another preset profile. Therefore, the system is constrained to only the preset profiles. A micro controller interfaces with a stepper motor in order to control its movement. The micro controller contains software or computer instructions for controlling the movement of the stepper motor based on the acceleration or deceleration profile that is already preset. The preset profile is modified in order to access a new desired deceleration or acceleration profile.

By contrast, the present invention does not change profile. An objective function is defined in a real-time controller program. A program means, having the real-time controller program and objective function, produces optimized step-time sequence instructions after a real-time feedback is received, to minimize a result from the objective function. As explained in paragraph 40 of the specification, "the objective function is a measure of how closely the physical system response matches the desired response." Pigott '434 does not teach any means for measuring how closely the physical system

response matches a desired response. The Office has acknowledged that Pigott '434 fails to teach or suggest real-time feedback. Pigott '434 is not concerned with any physical system response. Therefore, Pigott '434 is not concerned with an objective function.

Pigott '434 also fails to teach or suggest a "program means minimizing the objective function result to improve the dynamic performance of the system," as recited in claim 5. As explained above, Pigott '434 is not concerned with any physical system response or minimizing a result from the objective function.

Moreover, Pigott '434 fails to teach or suggest "generating an objective function model for optimizing a step-time sequence for a stepper motor" or "loading an optimization program including the objective function model", as recited in claim 6, for the same reasons described above.

Since Pigott '434 does not teach or suggest a method for controlling stepper motors as the Office suggests, the Office's obviousness rejection is overcome. There would be no advantage for combining Pigott '434 with Hill '657 since Pigott '4343 teaches nothing more than a microcontroller for controlling a stepper motor.

Independent claims 5 and 6 are distinguishable from Pigott '434 for essentially the same reasons as claim 1.

Regarding Hill '657, the Office bases its arguments on Fig. 3, the abstract, and col. 7, lines 57-68, and col. 8, lines 1-25. It is presumed that Fig. 4 was intended to be the basis for the rejection instead of Fig. 3.

Applicant respectfully submits that Hill '657 fails to teach or suggest "program means for executing a real-time controller program containing an objective function" to produce optimized step-time sequence instructions. Hill '657 teaches a system in which real-time feedback is achieved between a processor/controller 14 and a shaft encoder 42,

to determine the error between a theoretical or commanded position of a motor shaft 44 and the actual position of the motor shaft 44. (col. 12, lines 34-38). This error, which is the difference in position between a theoretical or commanded position and the actual position, is not contained in any real-time control program. This error is just a calculation based on feedback that the processor/controller 14 receives. Furthermore, this error is not concerned with how close these positions match. Instead, this error is concerned with how far apart the actual and theoretical positions are so that a force can be sensed and controlled. (col. 15, lines 65-68; col. 16, lines 1-45). The Hill '657 patent is not concerned with bringing the theoretical and actual positions closer. The Hill '657 patent is not concerned with optimizing. No optimized step-time sequence instruction is taught or suggested. Notably, the Office has not indicated what is being optimized in Hill '657.

Turning to the Office's basis for rejection, the only instructions that are disclosed in col. 8 of the Hill '657 patent are instructions that are generated by a user. A user 94 provides command interpreter 10 with instructions, which are relayed to control/processor 14. (col. 8, lines 3-10). Although control/processor 14 responds to the instructions by generating sequence data, it is producing the sequence data because of user instruction. In contrast, claim 1 recites a real-time controller program for "receiving real-time feedback from the stepper motor to produce optimized step-time sequence instructions." No user intervention is involved.

Since neither Pigott '434, nor Hill '657 teaches or suggests "program means for executing a real-time controller program containing an objective function," claim 1 is believed to be patentable.

Since claims 2-4 depend from claim 1, they are deemed to be patentable for the same reasons as claim 1.

Claim 5 recites "program means minimizing the objective function result to improve the dynamic performance of the system using a generated step-time sequence based on the desired result," and a program means for "evaluating the objective function for each perturbation to optimize the system response." On the other hand, Hill '657 discloses a controller/processor 14 that responds to a user 94 to produce a sequence of data. Hill '657 also discloses a controller/processor 14 that measures an error between theoretical and actual position, or how far apart the positions are, to sense and control force. This measure is not concerned with how closely the positions match. An objective function is the measure of how closely the physical system response matches the desired response. Thus, Hill '657 does not teach or suggest program means minimizing the objective function result or program means for evaluating the objective function to optimize the system response.

Claim 6 recites running an optimization program, which includes an objective function model, on an interface computer to generate and optimize step time sequence. In Hill '657, a user 94 is responsible for providing a command with instructions which are provided to a controller/ processor 14 that generates a sequence of data. Hill '657 also discloses a controller/processor 14 that measures theoretical and actual position to sense and control force. As explained above Hill '657 does not teach or suggest any program including an objective function model.

Independent claims 5 and 6 are distinguishable from both Pigott '434 and Hill '657 for essentially the same reasons as claim 1, and are believed to be patentable for the same reasons as claim 1.

Accordingly, the application and claims are believed to be in condition for allowance, and favorable action is respectfully requested. No new matter has been added.

SUMMARY OF INTERVIEW:

The undersigned thanks the examiner for the interview conducted on Tuesday, April 19, 2005.

The substance of the interview on April 19, 2005 was as follows.

The undersigned sought clarification of the Office's grounds for rejection. First, the undersigned asked the examiner to identify the real-time controller program in the Pigott '434 patent. He identified the microcontroller described in col. 14, line 1.

Then the undersigned asked the examiner to identify the objective function (claims 1 and 5) or objective function model (claim 6) in Pigott '434. The examiner explained that the abstract discusses a process for changing the acceleration or deceleration profile. The undersigned explained that the modification is made while the profiles are being executed in Pigott '434. On the other hand, the present invention includes an objective function that is defined in a program before any execution. Thus the examiner agreed that Pigott '434 does not teach a program means containing an objective function.

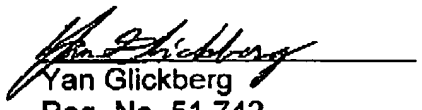
The undersigned also sought a clarification of the Office's rejection based on Hill '657. The examiner pointed out that Fig. 4 was intended to be the basis for rejection. The examiner pointed out that Fig. 4 shows a shaft encoder 42 which provides real-time feedback from the motor to a real-time controller/processor 14 (e.g., the commanded position goes to the processor). The real-time controller/processor 14 produces a sequence of instructions to change the shaft position. According to the examiner, the real-time controller/processor 14 sends a signal to the motor to carry out the instructions and make the change to the shaft position. Thus, the examiner deems the "optimized sequence instructions" produced by the program means recited in claim 1 to be the instructions generated by the real-time controller/processor 14 for changing the shaft

position in Hill '657. The undersigned noted that Hill '657 does not teach a program means having an objective function and running the program means to generate optimized time-sequence instructions. The examiner did not agree.

If any issues remain which may be resolved by telephonic communication, the Examiner is respectfully invited to contact the undersigned at the number below, if such will advance the application to allowance.

Favorable action is respectfully requested.

Respectfully submitted,



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